



## **Characterization of the Livestock Production Systems and the Potential of Feed-based Interventions for Improving Livestock Productivity in Kaptumo Division, Nandi South (Kenya)**

*By Sylvia Wafula (ICRAF), Josephine Kirui (ICRAF), and Ben Lukuyu (ILRI)*

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### **Introduction**

Kapcheno Multi-Purpose Company Limited is a farmer producer organization located in Nandi County; Kaptumo Division (N;00°041'502. E 023°25'924. Elevation; 1965m). It was started in the year 2009 and covers the following locations in Kaptumo Division; Kaptumo, Kaiboi, Koyo, Ndurio, Kapkolei, Kesogon, Kapsaos and chepkongony.

The Feed Assessment Tool (FEAST) was used to characterize the feed-related aspects of the livestock production system in Kapcheno Multi-Purpose Company Limited catchment area. This was done to help design feeding system interventions that are specific to Kapcheno Multi-Purpose Company Limited catchment area. The exercise was done November 2014. Thereafter feedback of the PRA results to the PO management was done in February 2014. This was carried out by East Africa Dairy Development project (EADD-P) in collaboration with the Ministry of Agriculture, Livestock and Fisheries and Kapcheno Multi-Purpose extension staff. The main objectives of this study were to get;

- i) A general overview of the farming systems
- ii) identify major feeds and feeding related production problems, existing opportunities and potential interventions that would inform estimation of the feed gaps in the area.
- iii) to guide the management of Kapcheno Multipurpose develop an implementation plan that will address dry season feed gaps and improve livestock the production and productivity in the area.

## **Methodology**

### *Sampling*

Farmer representatives both male and female were selected from each of the eight locations to participate in the PRA focused group discussion. The selection was done based on the size of land holding. Two focused group discussions were undertaken one in Kesogon (27 farmers, 18 male, 9 female) and Ndurio (23 farmers; 15 male and 8 female). From each category of land holding size in the discussion groups, key informant farmers were purposively selected and individually interviewed in the seven Locations. These were 6 farmers, 2 from each category of land holding small scale, medium scale and large scale.

### *Data collection*

The assessment was carried out using qualitative and quantitative methods of data collection. Focused group discussions (FGDs) were used to gather qualitative information on farmers perceptions about; farm sizes, household sizes, farm labour availability, annual rainfall pattern, irrigation availability, types of animals raised, general animal husbandry, access to credit, access to farm inputs, problems issues and opportunities within the livestock system. An interview using a structured questionnaire was used to collect quantitative information. The structured questionnaire was administered to nine key farmer representatives owning small, medium and large scale farms. The issues covered in the questionnaire were; dominant breeds, types of food and cash crops grown, how the crop residues are utilized, types of fodder crops grown and how much each feed resource contributes to the diet.

### *Data Analysis*

The qualitative information gathered during the focused group discussions was examined and reported. The quantitative data collected from individual key informant farmers were entered into the FEAST excel template ([www.ilri.org/feast](http://www.ilri.org/feast)) and analyzed

## **Key Findings**

The following are the findings of the assessment, and existing opportunities in the area.

### **Farming system**

The farming system is mixed crop- livestock with maize and tea dominating in all the eight locations (Kaptumo, Kaiboi, Koyo, Ndurio, Kapkolei, Kesogon, Kapsaos and chepkongony). Land holding varies across households with the majority belonging to the small scale category and owning 5 acres (2.5 hectares) of land. The average family size is 7 people per house hold

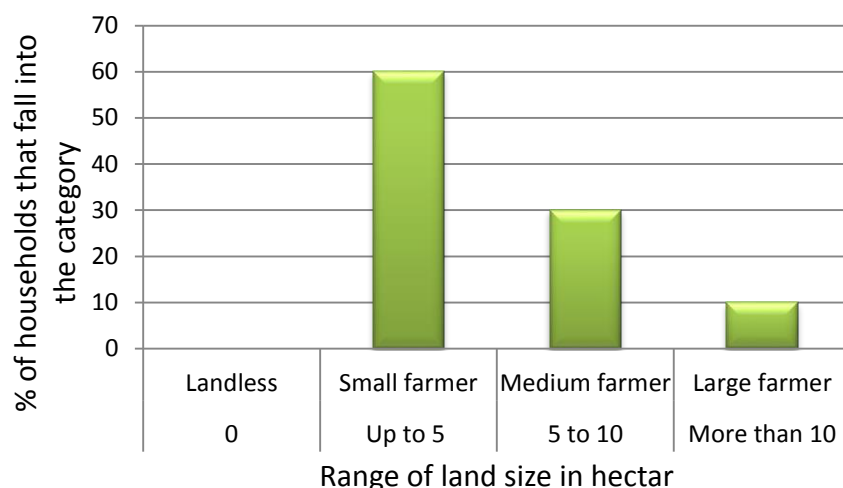


Figure 1: Average land sizes owned by farmers in various categories

The area experiences two cropping seasons influenced by the rainfall pattern as shown in table 1 . Maize, tea, Irish potatoes, sorghum and millet are established during the onset of the long rains. Land is utilized for more than one crop in a year and short term maize varieties, beans and Irish potatoes are established from August.

Table 1: Cropping Seasons in the area

Name of Season	Jan	Feb	Mar	Apri	may	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Long rains												
Short rains												
Dry months												

Crops grown in the area are, maize , tea, coffee, sorghum and common beans with tea and maize dominating in all the eight locations (Kaptumo, Kaiboi, Koyo, Ndurio, Kapkolei, Kesogon, Kapsaos and chepkongony). Crop production in the area is highly rain-fed and none of the household practices irrigation. In Katumo, Kaiboi, Koyo, and Ndurio, labor is easily available with farmers using both hired and family. However, in Kapsaos location, there exists competition for labor amongst livestock, tea and gold mining and competition with sugarcane in Kapkolei. Labor is highly required during planting, weeding and harvesting and price for weeding depends on the condition of the farm (ranging from Ksh 2500(27 USD) to Ksh3000 (32USD) per acre.

The area experiences land scarcity and land for leasing is not easily available. Majority of agricultural inputs are readily available at Kaptumo market except pasture seed. Credit facilities tailored towards crops and livestock production is available and the lending conditions depend on; the terms and conditions of a financial institution and the relationship one has established

with the institution. Some institutions require one to save for several months before qualifying for credit, while others use are based on milk and tea delivery receipts.

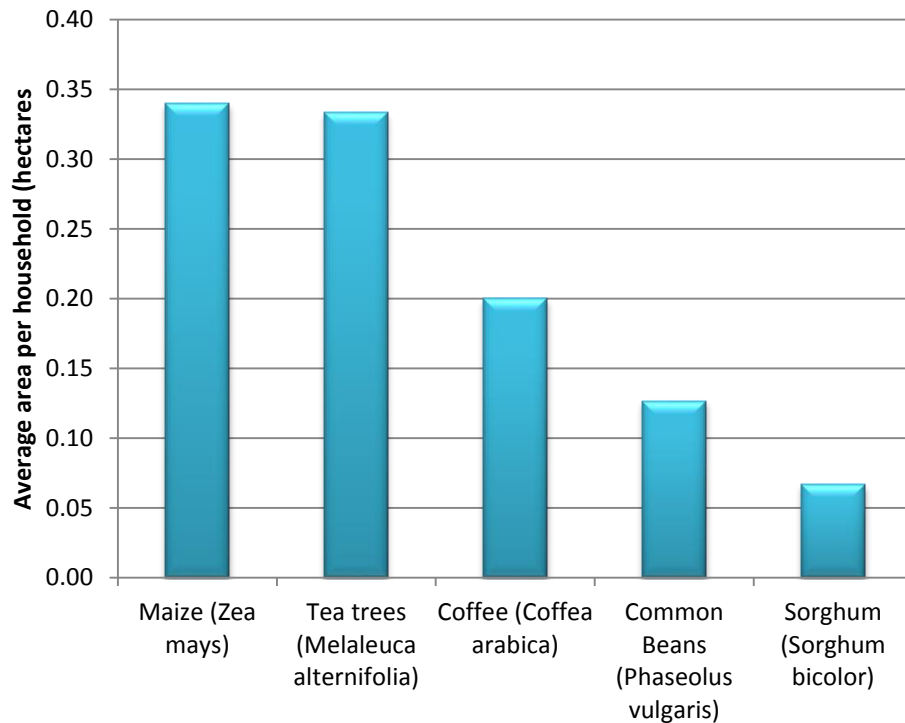


Figure 2: average area per major crops grown by farmers

### Sources of Income

Dairy is the main contributor to house hold income, making a contribution of 39% followed by crops at 29% and local vegetables. Off farm business contribute 7% while 5% provision of labor services contributes 5% (Figure 3).

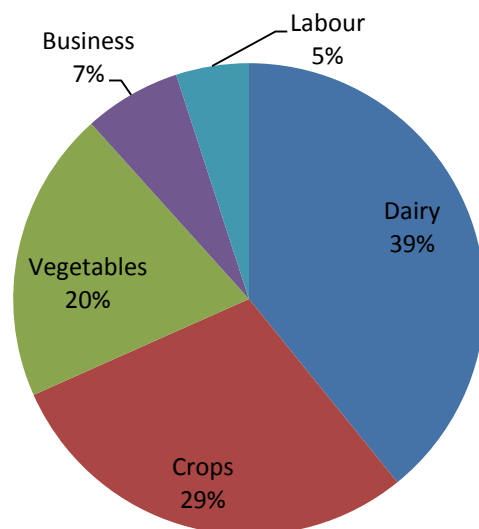


Figure 3: Contribution (%) of livelihood activities to household income

### Livestock production systems

The livestock production system is semi intensive with improve dairy cattle being the most preferred species (Figure 4). Local dairy cattle dairy cattle, fattening and draught cattle are kept in Kapsaos Location. In this area livestock is mainly kept for income and food. Other uses include provision of manure, and payment of bride price. The average milk production in the region is 4.5 liters per cow per day (EADD2 Baseline report).

Framers reported that majority of the households do not house their livestock and they main style of feeding is grazing in paddocks with a little supplementation of planted forages. Feed processing is by chopping and sprinkling with salts. It was also reported that none of the farmers use urea treatment for the crop residues.

Veterinary services are easily accessible although the price for ECF treatment is high goes up to 3000 KES depending on the severity of the case. However farmers reported that A.I is not easily accessible and the price ranges from 1000 KES to 1000KES and varies according to breed and distance covered by the A.I service provider. It was also reported that there are high repeat rates, as high as 80%, this causes majority of the farmers to opt for improved bull services as they are offered for free by their neighbors.

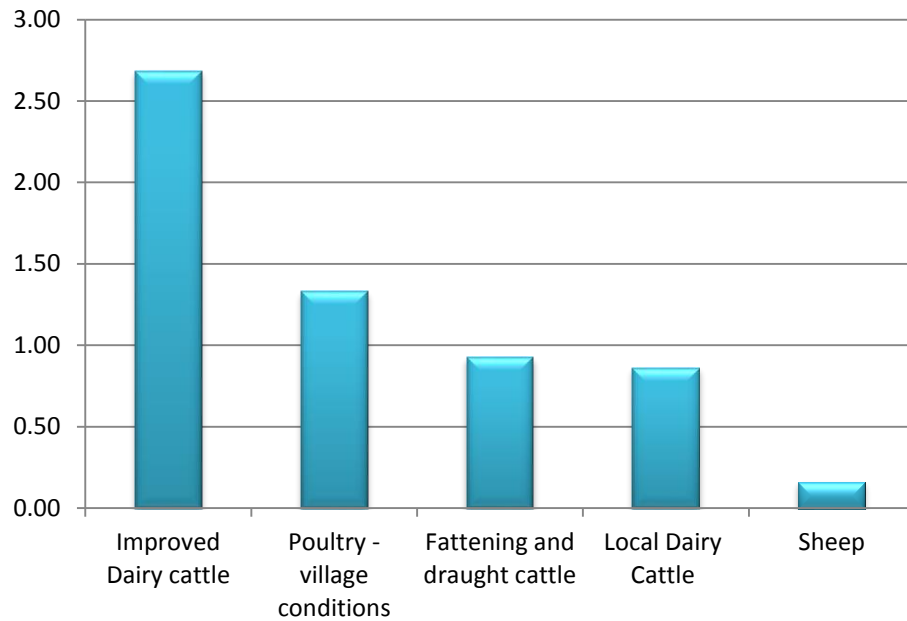


Figure 4: Average livestock species holdings per household in Tropical Livestock Units

### Feed Resources Availability and feeding

From figure 5, most common feed resources in the area are, crop residues, natural pastures, naturally occurring weeds collected on farmlands during the rainy season. Farmers reported feed scarcity from the months of January to April. Grazing is practiced the entire round and contributes 33% dry matter (DM), 32% metabolizable energy (ME) and 17% crude protein (CP) to the total diet. Crop residues in the area include bean haulms, green maize Stover collected after selling green maize and dry maize Stover collected after harvesting the mature dry maize. The crop residues contribute 10% dry matter (DM), 9% metabolizable energy (ME) and 5% crude protein (CP) to the total diet.

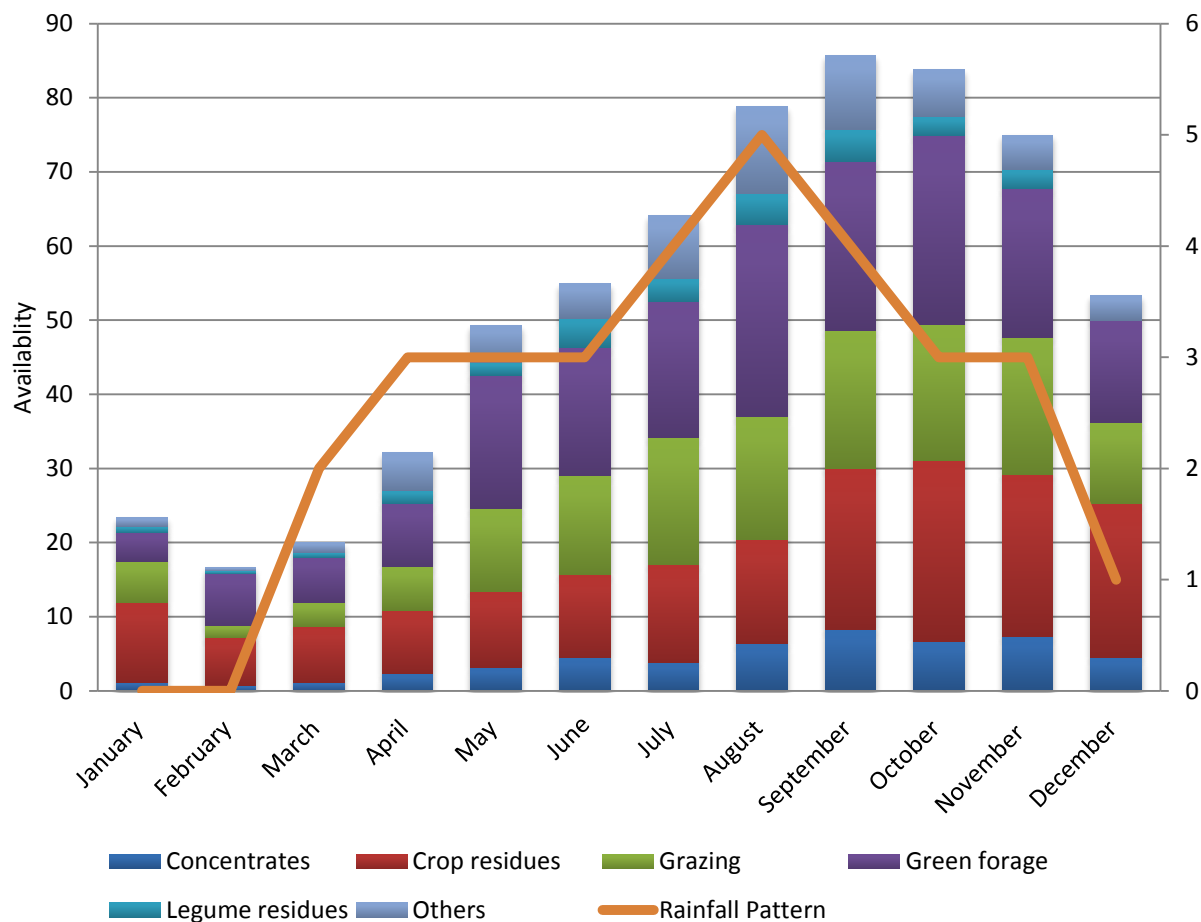


Figure 5: The composition of the livestock diet throughout the year in relation to the rainfall pattern

The highest contributor to the total daily diet is cultivated fodder contributing, 51% dry matter(DM), 52% metabolizable energy (ME) and 69% crude protein (CP) ( Figure 7, 8 and 9). The most common cultivate fodder are, lucerne, Nap ire and Rhodes grass with Lucerne (Figure 6 below).

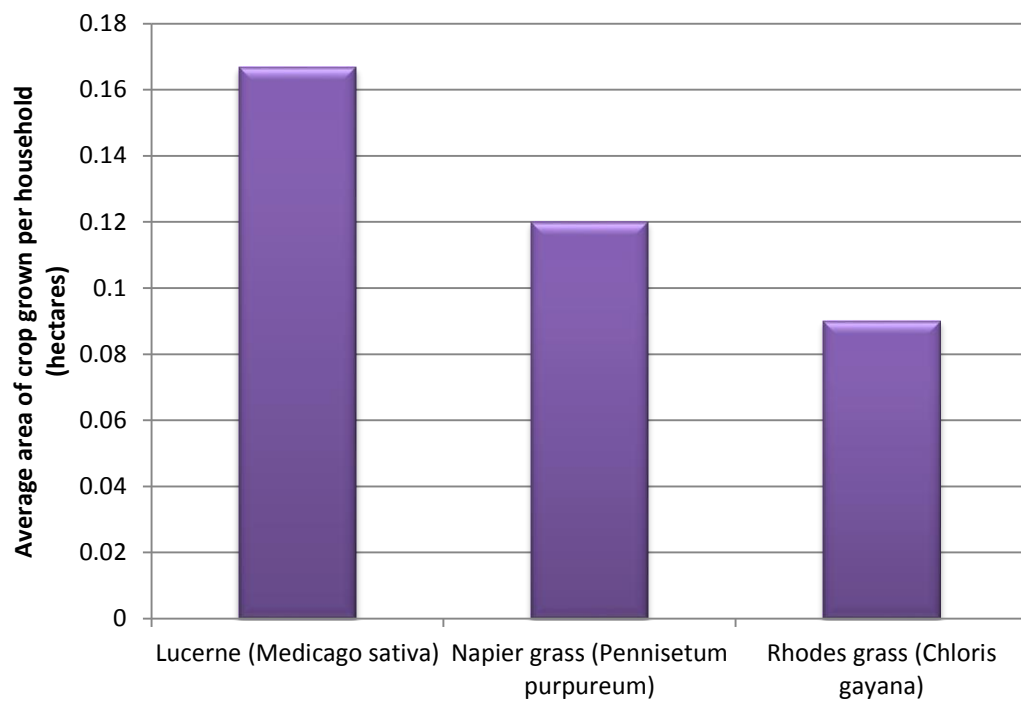


Figure 6: Dominant Fodder crops grown in the area

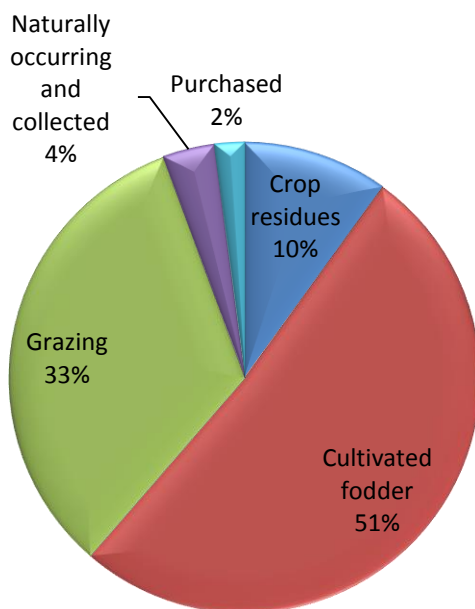


Figure 7: Dry Matter Content of total diet



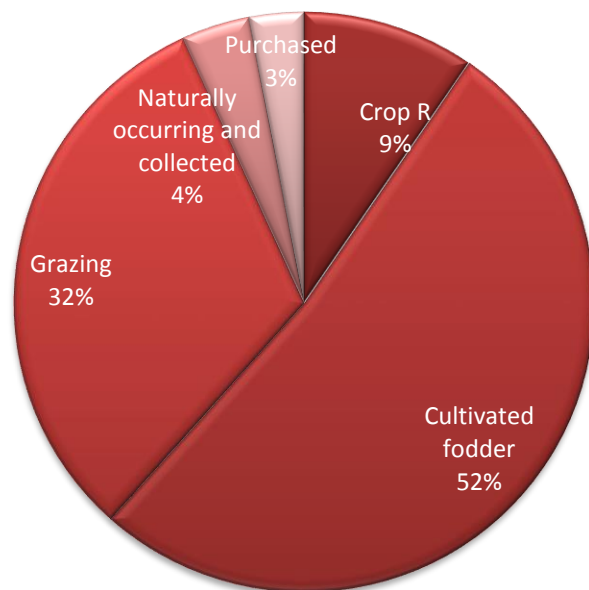


Figure 8: ME content of total diet

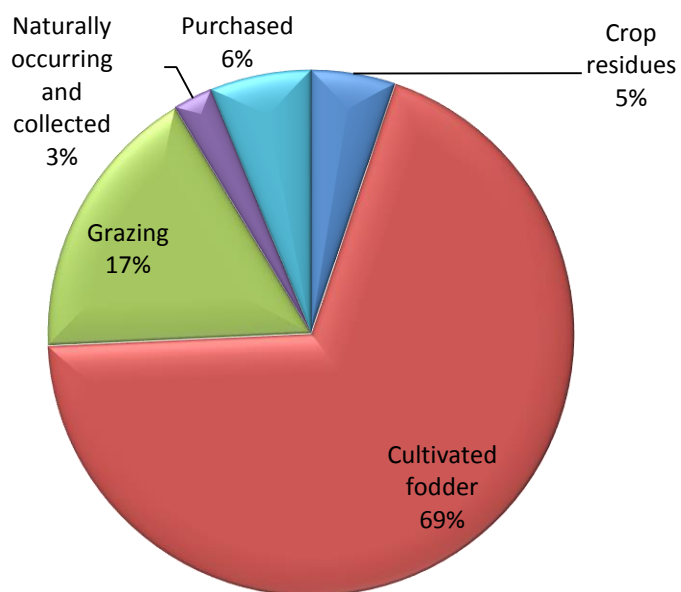


Figure 9: CP content of total diet

## Problems Issues and opportunities

Table 2: Problems, issues, proposed solutions by farmers and key areas of intervention from the feedback session

Problem Rank	Identified constraint	Proposed solution by farmers	Proposed Key interventions from the feedback session
1	Fluctuation of milk prices and delayed payment form Kapcheno Dairy	prompt payment form Kapcheno	Kapcheno to explore ways of getting funds to pay the farmers e,g getting a bank overdraft
2	Inadequate Knowledge on feed conservation	Building capacity on feed conservation	Trainings to be done through demonstrations
3	Inadequate water for livestock especially in Kapsaos location	Create linkages with financial institutions and suppliers of tanks for farmers to access through check off	Make agreements with financial institutions and suppliers of water tanks
4	High cost of feed processing equipment ( eg Pulverizers	Kapcheno to link farmer to suppliers.	Create linkages with financial institutions for farmers to access through check off
5	Inadequate knowledge on feed ration formulation	Trainings on feed formulation	Trainings to be done through demonstrations
6	unavailability of seed and vegetative planting material	Stock the agro-vet with seeds	Establish working relationship with seed manufactures to acquire at stockiest price Use volunteer farmer trainers to multiply and bulk seed and vegetative planting materials.
7	Unavailability of feed during dry season	Kapcheno to stock the agro-vet shop with Hay	contract farmers to Produce hay for Kapcheno.

## **Summary and Existing Opportunities**

Results indicate that majority of the households in Kaptumo fall under small scale with land size averaging 2.5 hectares. Despite this cultivated fodder emerged as a major feed resource base followed by grazing. The most common cultivated fodder is Lucerne, Rhodes and Napier grass. Broadening the feed resource base to include a variety of forages like; Desmodium, Vetch, Forage sorghum, improved Napier varieties, sweet potato vines, Nandi setaria, Columbus grass. In addition to this, introduction of drought resistant varieties and fodder trees in drier locations (Kapsaos and Kapkolei) will ensure farmers have feeds all year round.

Although crop residue contributes 10% dry matter (DM), 9% Metabolizable Energy (ME) and 5% crude protein (CP), Farmers reported that none of the household treats the maize Stover to improve its digestibility and nutritive value. This presents training need to capacity build farmers on crop residue handling, treatment and utilization.

## **Way Forward and Key areas of intervention**

From the feedback discussion, an implementation plan has been developed (annex 2) to address the following key issues.

### *Technological interventions*

1. Broaden the feed resource base by introduction of other feed resources like forage sorghum, Columbus grass, Nandi setaria, Improved Napier varieties, fodder trees, Vetch oats, and Bracheria
2. Training of Crop residue handling, processing and utilization
3. Training on feed conservation ( silage and hay making)

### *Institutional interventions*

1. Establishing sustainable working relationships with input suppliers to enable stocking of the agro-vet with improved pasture and fodder seeds, high quality commercial concentrates, simple feed processing equipment ( pulverizers and brush cutters),
2. Explore best ways of having hay stocked in Kapcheno agro-vets stores; either by contracting hay producers or Kapcheno renting land to produce its' own
3. Identify volunteer farmer trainers to complement the existing extension structures
4. Use of Volunteer farmer trainers to multiply and bulk forage seeds and vegetative planting materials.

## Annex 1: Feed gap Estimation Results

Current situation; average milk production= 4.5liters/cow/day (EADD baseline report 2014)

Target production = 11.4 liters/cow/day

Estimated number of cows in the area =45000

Total Dry matter deficit from the feed gap estimation = 288512 kg DM

### Assumptions:

1. Assumed 6kg DM/ bale of hay,
2. Total yield of 200 bales/ care /year
3. For Grazing, a cow is able to picks only 5kg DM/day

Feed Resource	Dry Season Gap ( DM kg)	Rhodes DM (Rhodes+ Naturally occurring)	Estimate bales	Estimate Acres under Rhodes	Estimate acres under other forages ( takes a percentage of the area under grazing
Rhodes	164220	177100	29516	147.58	
Naturally occurring collected	12880				
Grazing	106260				
Purchased	5125				
Estimated area under grazing to meet the above (61277) DM requirement	21252 acres				5 % of 21250 acres

### List of References.

Duncan, A., York, L., Lukuyu, B., Samaddar, A. and Stür, W. (2012). Feed Assessment Tool (FEAST) Questionnaire for Facilitators (Version 5.3); A systematic method for assessing local feed resource availability and use with a view to designing intervention strategies aimed at optimizing feed utilization.